The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents

The registered telegraphic address of the Secretary of the United Planters' Association is "Planting."

A very interesting article is published by the Planting Expert, recording the impressions of his recent visit to Coorg to inspect some of those estates that are infected with Green Bug. He has, we believe, solved the question as to how the pest has been brought into Mysore and Coorg, and it must be a source of congratulation to all and especially to Messrs. Stanes and Co., that the erroneous idea that it was brought into the Coffee planting Districts on manure bags from their works has been laid to rest. Incorporated in the Planting Expert's article are some letters which should be read, as they entirely absolve Messrs. Stanes and Co., and should restore confidence. The whole article is especially interesting at this time. With the monsoon on us, helping to check the pest, breathing time will be given to planters to prepare for the fray afterwards. We trust that all will co-operate in the good work and follow the advice given by Mr. Anstead.

A very interesting letter from Mr. Brown dealing with the same subject is published, giving the prescription and method of making it, as used by himself with success. What one man can do, all can do.

We publish from the *Ceylon Department of Agriculture Bulletin*, by Mr. R. H. Lyne, a remarkable description of some yields of some Henaratgoda Hevea Rubber Trees. One puts down the paper, after careful perusal, convinced that the best way to attain the greatest yield is greater distance of planting apart.

It has been definitely decided that the Annual Meeting will take place on August 25th, 1913.

Scientific Officer's Papers.

CXVIII.—Green Bug in Mysore and Coorg.

I have recently paid a visit to Coorg and inspected some of the estates there infected with Green Bug (*Lecanium viride*). The infection appears to be scattered over a wider area in Coorg than in Mysore, and though the present attack is quite a light one, the matter is very serious and calls for co-operative action among the planters. This has been fully recognised in Mysore, and as already reported in the *Chronicle*, a combined meeting was held at Chickmaglur on 20 May to discuss the situation. At this meeting several important resolutions were passed. The first asked for the aid of the Mysore Government in endeavouring to locate the source of infection. This is a very important matter, since could the source of infection be discovered, it would largely influence the measures of control which must be adopted. In all probability this source has already been discovered, but before dealing with that it is necessary to discuss a rumour which was at one time current, and which I believe is still current in Coorg, that the pest was introduced in manure. As I pointed out some weeks ago I do not consider this at all likely, but still one particular Firm has been picked out because of the proximity of their works to the Nilgiris and their extensive dealings with that district, and more or less accused of sending manures to Mysore and Coorg planting districts in bags infected with Green Bug.

Now I hold no brief for any Firm, but I feel very strongly that it is very unjust to connect the name of any particular Firm with such a theory until it has been proved, and it is only fair to Messrs. Stanes & Co. to repeat that they assure me that they take every precaution not to send out bags received from the Nilgiris, and that their coffee curing works and manure works are quite separate. I have much pleasure in publishing the following correspondence received from Messrs. Stanes & Co. for the purpose, and I trust that until more is definitely known about the source of infection no more will be heard of the manure bag theory of importation in close connection with this Firm. The correspondence referred to is as follows:—

Messrs. Stanes & Co., to the Editor of the *Planters' Chronicle*.

"As we have received enquiries from several of our constituents in Mysore and Coorg in reference to the rumour afloat in those Districts that the Green Bug had been introduced through our manure bags, we beg the courtesy of your columns for the publication of the following two letters sent in reply to our letters to those gentlemen on the subject.

"Although Mr. Scholfield at first put down the outbreak on his estate to our manure bags, he was afterwards convinced that he had been led to a wrong conclusion on insufficient data, and we are much obliged to him for the handsome way in which he retracts his previous statement.

"We also heard that the Manager of Ubban estate had given it as his opinion that the bug on his estate also had been introduced through our bags. As we had not supplied this estate with manure for many years now, we wrote to the Manager referring to the report in question, and asked him kindly to inform us on what grounds he attributed the infection to our bags. Nothing can be more satisfactory than Mr. Rutherford's reply.

"As far as we are aware Lingapur is the only infected estate that has had manure from us of recent years, and Mr. Scholfield's letter effectually disposes of the baseless theory.

"What we cannot understand is that our Firm should be singled out as the one through which the pest was introduced. Surely our proximity to the Nilgiris is not a sufficient cause, and besides we are not the only manure suppliers here, nor are we the only Firm that have dealings with Nilgiri Planters. We can only repeat in conclusion what we have already stated in your columns through Mr. Anstead, *viz.*, that our Manure Works are a mile distant from our Coffee Curing Works, that these two Factories have no connection with each other, and not a single crop bag has been used for packing manure in.

"We trust that this communication will satisfy all our Mysore and Coorg friends that whatever might be the source from which the pest was introduced, it was most certainly not through our manure supplies.

"Thanking you in anticipation for the courtesy of your columns for this rather lengthy communication,".

The Manager of Lingapur Estate, Saklespur to Messrs. Stanes & Co.,

"I thank you for your letter of the 24th instant in reference to the extract Mr. Irwin Durham read to you from a letter I had to written him, in regard to the outbreak of "Bug" on this estate, and to my conclusion that it had been imported with the manure he sent me.

"From what you now inform me, I am quite ready to believe that it is quite impossible for the bags to have been infected at your works, but I think it might be possible for infection to take place while bags were in transit, either on the Railway or else during cartage up the ghaut. Mr. Durham no doubt will have given you full details of the outbreak here, and how everything pointed to the manure; there is still no signs of the pest on any of my remaining fields.

"Mr. Durham kindly sent me a list of a dozen estates or more to which he supplied manure at the same time as he did to me, and as none of these estates report bug, this is sufficient to prove to me that the pest could not have been imported from your works. The Cooly theory is quite out of the question in my case, as I employed no new coolies during the last 12 months.

"I shall be very pleased to show your letter to any of my friends who may bring the point of importation up."

The Manager of Ubban estate, Saklespur to Messrs. Stanes and Co.

"I am in receipt of your letter of 2nd instant to Mr. J. G. H. Crawford and as that gentleman has been in England since March, and an outbreak of "Green Bug" on this estate was not noticed till after he left, I conclude your letter refers to me.

"I note you are informed that "I have expressed an opinion that Green Bug was introduced on this estate through the medium of bags containing manure supplied by your Firm."

"I have expressed no such opinion, which would have been absurd, as this estate has had none of your manure for several years. I would take it as a favour, if you would kindly ask your informant on what he bases his statement, as I think he owes me an apology."

Now as to the probable source of infection. This has been pretty well worked out as far as Mysore is concerned, though it cannot as yet be *absolutely proved*. In the first place it was found that the native gourds grown in every village and in the lines on the actual estates have been recently infected with a scale which the coolies recognise as Green Bug and which they declare is the same as that now on the coffee, "which master is

making so much fuss about." They are almost certainly right for they appear to know this scale quite well. These gourds in the lines have been cut down and thrown on the manure heaps and this manure has naturally been put into the coffee and it is most noticeable that in many cases the attack of scale on the coffee is worst near the lines.

The next link in the chain of evidence is that on one estate the manager, who was short of regular labour at the time of the outbreak, employed open country coolies to deal with it and they recognised the scale and said that they had for the last few years seen this pest on their crops such as beans, peas, and millet. Of course the cooly is not always to be relied upon in these matters and they may have mistaken the Green Bug for another scale, but I do not consider this very likely. Granted that this evidence is true, there is little doubt that the pest did reach these estates on the manure bags for in nearly all cases where there has been an outbreak of the bug in Mysore, the manure was carted from the railway station in the months of August, September, and October when the cartmen always carry green fodder for their bullocks. If this green fodder was covered with Green Bug it would infect the bags and they would arrive on the estate infected. Hence in all probability in this instance the *pest was imported on the manure bags but not from the manure works as was erroneously supposed.*

This is still a theory at present and needs proof, but the planter who sends me the information says that he is personally satisfied that the infection has come into Mysore from the open country and it is more than likely that it came in in the way suggested above. I quite agree with this and indeed it is what I suspected all along.

As regards Coorg it is not so easy to trace the source of infection since much of the manure comes in from the coast side through country where green fodder cannot be obtained, but still Mysore carts are used to a certain extent. In view of what has probably happened in Mysore it is only reasonable at present to suppose that infection has taken place in Coorg in much the same way.

It is very noticeable in Coorg that the places which are badly infected are in the neighbourhood of the lines and along roads where manure was put down from the carts. If the bags and carts were infected this is only what one would expect, while the coolies applying the manure would carry it on their clothes to the lines. There is little doubt that the bags and carts were infected, the point is where did they pick up the infection and the answer to that question is I feel sure, 'in the low country from infected fodder."

In this connection I would warn planters who are dealing with Green Bug that they should not let the gang working on it go back to their lines after their work is finished through clean coffee, but take them along open roads to their lines and as far as possible keep them out of the coffee. The smoke and heat of the lines, especially in the monsoon, will disinfect their clothes to a great extent. It is true that after being dismissed at the lines some of them may go back in to the coffee for firewood, etc., but the infection is so easily carried and the matter is so important that I suggest that it might be worth while to have fire wood collected for the lines by special gangs while the pest is being dealt with.

With regard to the first resolution passed at the Mysore meeting we need the aid of the Mysore Government to enable us to thrash out the theory of infection outlined above and prove its truth or falsity.

The second resolution asked for the appointment of an Inspector for Estates not belonging to the district Planters' Associations. This appears to be a good move and probably the Mysore Agricultural Department will be able to help in the matter. In Coorg a pamphlet is being issued, and widely distributed, describing in simple language in English and Canarese, with the aid of a few drawings, the appearance of the scale and asking anyone who finds it to report it at once to the Commissioner, the Hony. Secretary of the Coorg Planters' Association, or the Scientific Assistant. This might well be done in Mysore also.

The third resolution passed at the meeting asks for some form of local Pest Act. I have always preached the necessity of Pest Acts and have written a good deal on the subject at one time or another, but the real drawback to such Acts is the difficulty of enforcing them.

In Coorg a Regulation is under discussion to make provision for the eradication of noxious weeds, and it would appear that a very similar Regulation might be passed for the eradication of noxious pests like Green Bug. The Regulation provides that the term 'noxious weed' includes Lantana, and any other plant, which, the Chief Commissioner may from time to time by notification, declare to be a 'noxious weed,' and that every landholder shall eradicate and effectualy destroy all noxious weeds growing, or being grown, upon the land comprised in his holding. The Commissioner, or any other officer specially empowered in this behalf by the Chief Commissioner, on finding any noxious weed on any holding, may issue notice to the holder thereof directing him to remove and effectually destroy such weed and to keep his holding entirely clear of it. In fixing the period within which the weed shall be eradicated and destroyed the officer issuing the notice shall have regard to the extent of the holding, the nature of the growth of the weed, and the pecuniary means of the holder. If any holder on whom such a notice has been served fails to comply therewith, he can be fined up to Rs.50 and if he still fails to obey the order the officer may send and destroy the weed for him and recover the cost of so doing as arrears of revenue.

The object of this Regulation is to eradicate Lantana which has been proved to "destroy grazing, encroach upon cultivation, render village sites and adjoining habitations unhealthy, harbour wild animals and insect life that seriously damage crops, and is very liable to fire which by reason of exceptional fierceness destroys tree growth and prevents reproduction." The necessity of staying the inroads of Lantana has long been recognised and various means were ineffectually adopted. "Early in 1906 a general campaign against Lantana was initiated based upon official persuasion and advice and backed up by offers of more extensive remission of assessment. Much official energy was expended on the movement which received considerable support from the ryots and it became clear that the desire to rid the country of Lantana was general, but that something more than persuasion is needed to induce the ryots to make the effort which they themselves admit to be so much in their own interest."

"The effects of persuasion and advice are waning, the industrious ryots have done their share, but their lands are in danger of reinfection through the neglect of their neighbours. Hence the necessity for legislation."

I have quoted this proposed Regulation at length because it appears to apply equally well to a pest like Green Bug, which if it becomes established will do far more harm than ever Lantana is capable of, and if the Regulation is passed it would appear to provide a reasonable precedent for a

similar Regulation to deal with noxious pests to be proclaimed from time to time by the Chief Commissioner. The Regulation is in fact a Pest Act.

In the case of Lantana the Regulation provides that no land holder shall be required to clear more than ten acres in one year. This would not apply in the case of a pest like Green Bug, and consequently, the cost would be more, but it is stated that in the case of Lantana "in cases where the cost of eradication is considerable the Government will be prepared to grant Takavi loans for the purpose of meeting the cost." The same leniency could be shown in the case of Green Bug where the cost of eradication was considerable, and I feel sure that the planters, would readily come forward with practical aid in the way of sprayers and supervision of the work by their Scientific Assistant if necessary, were they only sure that eradication could be enforced.

The pest has apparently come to stay for it will be practically impossible to eradicate it from low country crops and each year the danger of infection will be present. Consequently the planting community must make up their minds to tackle it and the cost must be estimated in general estate expenses. If ready for it and all work together to worry it as soon as it appears, there is no reason whatever why it should destroy Coorg coffee as it has done Coffee in other districts. In fact it is more nuisance than danger. But, (and it is a big but,) the danger point lies in the man who having got the Bug on his Coffee will do nothing to eradicate it and allows it to grow strong there and establish itself, escape on to shade trees and weeds, and act generally as a nursery and an infection centre for the rest of the district. It is to get at such an one if he should exist that legislation is necessary in my humble opinion.

I was glad to find that now the monsoon rains have begun, the white parasitic fungus of the scale is beginning to show up and kill the scale. With this fungus present, the monsoon will eliminate the adult scale to a large extent, but unfortunately with the advent of dry weather the fungus will disappear and the scale get the upperhand again, and eggs which have escaped destruction by the monsoon, or have been sheltered by ants in their nests, will hatch out and the pest will start again. Consequently the time to be ready with spray and brush, pruning knife and fire, to renew the campaign is at the end of the monsoon and those who have not got sprayers and the necessary materials for the spray mixture should see to it that they have everything ready before the end of the monsoon, for there is no telling whose turn it may be to be visited next. My advice to all is to be cheerful but ***be ready.***

The methods of control which are being adopted at present appear to me to be satisfactory. Trees which have been spur-pruned and had all their leaves removed should be scraped and lime washed and the mulch, &c., under them finally dug in. The lines and their neighbourhood should be cleaned up and kept clear of weeds and rubbish and any vegetables and plants grown round them should be kept under close inspection. With regard to sprayers the ordinary knapsack sprayer of the Four Oaks type though a good machine is too heavy for the cooly who finds a difficulty in pumping and spraying at the same time in heavy coffee with the machine on his back. The small pressure sprayer of the Holder type will, I think, prove the best machine for dealing with coffee which is a difficult crop to spray in any circumstances.

RUDOLPH D. ANSTEAD,
Planting Expert.

CORRESPONDENCE.

Calicut, 10th June, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—With reference to Mr. E. S. Clarke's letter to you of 9th ultimo, which appeared in your issue of the 17th idem, we shall be much obliged if you will kindly give the same publicity to the following copy of our letter to Mr. Clarke dated 27th ultimo, commenting on his figures:—

SHIPMENT OF TEA *via* MADRAS.

"We would venture to call your attention to a statement in your letter "of 9th instant to the *Planters' Chronicle* which we think can only have "been made under some misapprehension. We refer to the sentence "*.....and of course putting the Tea on board at Madras is* "far cheaper than at Calicut....."

"We have calculated the full cost to the estate of sending Tea *via* "Madras as compared to sending it *via* Calicut and we give hereunder the "figures in detail:—

PER FULL CHEST OF 120 LBS. GROSS.

"*Via Madras*			Rs.	A.	P.
"Rail to Madras at annas 10/8 per maund	...	...	... 0	15	7
"Shipping (not including fire insurance) ...	...	...	... 0	8	6
"Freight 30*s*. per 50 c. ft. equals 3*s*. per full					
"chest equals	Rs...	2 4 0			
"Less 10%	" ...	0 3 7			
			2	0	5
			3	8	6
"Add for fire insurance if required ...	...		... 0	0	6
		Total ...	3	9	0

"*Via Calicut*		Rs.	A.	P.
"Rail to Calicut at annas 6/5 per maund ...	...	... 0	9	7
"Cartage from Railway Station to Customs House—about		... 0	0	5
"Shipping (including Fire Insurance) ...	...	... 0	6	0
"Freight at 30*s*. per 50 c. ft. ...	...	... 2	4	0
	Total ...	3	4	0

"We may mention that we have heard from Madras that the rate of "annas 8, pies 6 for shipping a full chest does not include fire insurance but "that fire insurance can be covered for an extra 6 pies per chest.

"You will see therefore that Calicut is cheaper than Madras to the "extent of 5 annas per full chest if fire insurance is included and annas 4, "pies 6 per chest if fire insurance at Madras is not necessary.

"The above comparison applies of course to the fair weather as "we do not have direct London steamers here during the monsoon. We "have, however, as you know, in the past had direct London steamers "at Cochin during the monsoon. The charges for shipping in Cochin during "the monsoon are 7 annas per chest for breaks over 100 chests and 8 annas "per full chest for breaks under 100 chests. We are not sure what the rail

"charges are from Mettapollium to Ernakulam (the station for Cochin) but "you will no doubt know these. Taking the rail charge from Mettapollium "to Ernakulam as not exceeding the rail charge from Mettapollium to "Calicut, there is still, as you will see from the above figures, 3 annas per "full chest in the case of breaks under 100 chests and 4 annas per full chest "in the case of breaks over 100 chests, in favour of Cochin during the "monsoon as compared to Madras.

"We think you will agree with us that in the circumstances the sent- "ence we refer to in your letter to the *Planters' Chronicle* is no doubt "inadvertently rather misleading."

Thanking you in advance,

We are,
Dear Sir,
Yours faithfully,
Per Pro. Peirce, Leslie & Co., Ltd.
(Signed) J, DELL,
Manager.

Glendale Tea Estate,
16th June, 1913.

THE EDITOR,
Planters' Chronicle,
Bangalore.

Dear Sir,—In connection with the "Green Bug" that has now appeared in Coorg, I have no doubt that many planters, who know that I wrote a good deal on the pest in June 1910, in the *Madras Mail* would be glad to have a few further particulars on the subject.

Now that the pest has got in, it is bound to keep there, as so many jungle and shade trees are Bug Feeders.

It is much to be desired, that our worthy Scientific Officer's sanguine hopes, will be realised, and that the Bug will be kept under, but I cannot think that this is possible.

I still continue the "Spraying" on my small acreage and still maintain that the cost with a sprayer need not exceed Rs.10 per acre per annum, unless the Estate is badly affected.

I do not now use anything more than rosin and soda, as no soap is needed and it keeps temptation out of the way of the cooly. Resin hermetically seals the bug up and all it needs is to be rendered soluble in water, which is accomplished by boiling with washing soda. The method indicated must be rigidly followed, or the result will be disappointing. It has to be remembered, that perfect chemical combination of the soda and resin is wanted, and there is only the one way. A cooly must be carefully and specially trained to cook the stuff the right way.

I have copies of all the letters I published for free distribution to any who want copies.

I will now repeat the way to prepare the solution, as there have been so many corrections, that may perplex at the start.

Get 2 empty kerosine oil tins, which can be purchased usually from oil engine users for about annas 8 each. A tin is just 4 gallons.

Take 1 pound of resin and 1 pound of soda. Powder on any common rock, that is handy, and mix the two well. Place in one of the tins with a

pint of water or so and place on the fire. As the mixture melts, add more water, until the tin is about half full. Continue boiling about 2 hours, if necessary. Test by dropping a spoonful into a glass of water, and if the solution is a pretty amber, the mixture is RIGHT, if milky WRONG. Don't use a severe flame. Take off the fire and allow to cool. When cold mix with cold water to the 2 tins full and your stuff is ready to go into the Sprayer for use. Dilute to 10 gallons, for mild attacks, but for virulent attacks, keep to the 8 gallon solution. Don't be tempted to boil too much in a tin at a time. Keep a dozen pairs of tins going, and stock the stuff for the Sprayer.

It takes from 3 days to a week to see the pretty little green creatures turn brown, and the planter finds this a prettier colour for his feelings.

Don't despair if you find lots on again, in a month or so. Be satisfied that the bulk has been killed off, and your crop saved. Go at it again and *again Stop in wet weather. Be always ready about January, May and* again in September, October to work with Sprayers,

Pardon haste and errors, caused by pressure on time and if more information is needed, I will try and supply it.

I say again I have never given up the spraying, and that I get crop, and have been tempted from the spraying to work INTENSIVELY and to plant up new patches.

Yours faithfully,

(Signed) THOS. BROWN.

RUBBER EXPORTS FROM THE AMAZON.

Mr. G. B. Michell (H. M. Consul at Para) reports that the quantity of rubber exported from Pará, Manaos, Iquitos, and Itacoatiara during the month of March and the three months ended March, 1912 and 1913, was as follows:—

—	Fine.	Medium.	Coarse.	Caucho.
March, 1912—	Kilogs.	Kilogs.	Kilogs.	Kilogs.
To United States...	923,127	269,153	828,225	644,050
To Europe ...1,114,992		169,333	317,312	619,521
Total ...2,038,119		438,486	1,145,537	1,263,571
March, 1913—				
To United States...	774,920	119,531	601,034	298,531
To Europe ...1,349,982		223,488	395,667	1,231,842
Total ...2,124,902		343,019	996,701	1,530,373
1st Quarter, 1912—				
To United States...2,836,148		687,022	2,041,416	1,112,458
To Europe ... 3,944,109		463,729	952,110	1,715,972
Total ... 6,780,257		1,150,751	2,993,526	2,828,430
1st Quarter 1913—				
To United States...2,576,506		439,270	1,824,145	843,961
To Europe ...4,076,557		711,053	864,381	2,793,177
Total ...6,653,063		1,150,323	2,688,526	3,637,138

—*The Rubber World.*

RUBBER.

Hevea.

YIELDS OF SOME HENARATGODA TREES.

The Ceylon Department of Agriculture Bulletin No. 4 by Mr. R. H. Lyne, Director of Agriculture deals with the above. Mr. Lyne says:—

"The fame of the Henaratgoda trees as rubber yielders rests upon the performance of the great tree known departmentally as No. 2, which in three and a half years yielded 275 lbs. of dry rubber. There are other trees at Henaratgoda equal in age and size to this great tree, but never having been subjected to systematic tapping, their capacities were unknown. Some of these trees, though they could hardly be expected to equal No. 2, might nevertheless, it was thought, be goood yielders.

At Henaratgoda there are three old Hevea plantations known as the First, Second and Riverside.

The First plantation is from the original seed procured by Mr. Wickham from the Amazon in 1876. The plants reached Ceylon towards the end of that year, and were planted at Henaratgoda in 1877; this plantation is, therefore, thirty-six years old. It contains forty trees planted irregularly the inside trees congested and small in circumference; the outside trees large.

The Second plantation was planted about ten years later, that is to say, in about 1886, with seed from the original trees; it is, therefore, of the second generation. It contains 211 trees planted 12 feet by 12 feet. The contrast between the size of the outside trees and that of the inside is also very marked.

In the Riverside plantation, also of the second generation, there are 81 trees scattered about, the trees being larger than those of the second. The outside trees also show a superiority of growth over their companions.

In October last, it was decided to place the outside trees of the three plantations under systematic tapping, with the object of ascertaining (1) whether any other trees besides No. 2 were good yielders, (2) the effect of room on the yield of Hevea trees.

GIRTH MEASUREMENTS.

Table I. brings out very strikingly the effect of room on the girth of Hevea. The average girth one yard from the ground of the ten trees in the outside row in the Second plantation is 76 inches; that of the trees in the row next inside 44 inches. The trees are tabulated as they grow: for example, No. 220 with a girth of 32 inches is next to No. 221 with a girth of 110¾ inches. The famous No. 2 measuring 117½ inches is not the largest tree, No. 39 (not in the table) being ten inches larger in girth (127½ inches). Some of the inside trees of the First plantation which are crowded and overtopped are very poor specimens, though presumably equal in age to the others. Thus, No. 20 is 40 inches in circumference, No. 13, 33 inches.

YIELDS OF DRY RUBBER.

Tapping on the 3V system half round the tree of these 38 outside trees was begun on November 1, 1912, and continued to February 15, 1913, when dry weather having set in the trees were rested. Tapping, therefore, took place daily for three and a half months. Tables II., III., and IV. give the weight of biscuit and scrap produced from these trees in the three plantations respectively.

The great No. 2 yielded 45 lbs. 3½ oz. of dry rubber in 76 days, an average of just over 9½ ounces a day. This tree far surpassed any other. No. 439 in the Riverside plantation is next in order to No. 2 with 24 lbs. 9½ oz., an average of a little more than 5 ounces a day. The next two in point of yield, Nos. 401 and 438 are also in the Riverside plantation. The trees of this plantation averaged for the 13 trees 12 lbs. 6¾ oz., against 11 lbs. 15 oz. of those a generation older and 7 lbs. 12 oz. of the Second plantation. The superiority of Riverside must be attributed to some extent to its proximity to the river.

But the yields from all these trees are good, and can only be attributed to the fact that they have had room to extend in one direction. In Bulletin No. 1 of September, 1912, page 8, the yields of some trees of the Second plantation are given as equal to an average of 1·4 lbs. per tree per annum. These trees are planted 12 feet by 12 feet, and Dr. Lock attributes the small yields to close planting. From this view there would appear to be no escape as within a few yards of these trees others, 12 feet from their neighbours in one direction but in the other with ample room for roots and branches to extend unchecked, have far surpassed them.

BRANCHING.

An examination of the manner in which these productive trees have branched and developed foliage reveals the remarkable power of Hevea to adapt itself to circumstances and to take opportunities. If we may be permitted a pleasantry, we can say that there is nothing of the Turvydrop about Hevea; it despises deportment. Its motto seems to be, "Get to air and light; elegantly if you can, but get there." This power of reaching light regardless of sympathy of dome is a valuable characteristic in the tree, and should be taken advantage of by planters. It possesses this power in a greater degree than any tree with which the writer is acquainted, resembling in this respect a bamboo more than an ordinary tree.

The famous No. 2, the butt of which with Mr. Wickham at its side figured so prominently in a photograph at the recent New York Rubber Exhibition, possesses no symmetry of form whatever at the top. It has a magnificent upright trunk dividing into two at a height of 12 feet from the ground. These two stems then continue upwards, but soon begin to lean outwards, finally expanding into a mass of branches and foliage bending in one direction outwards. The shape of the whole tree but for the fork is not unlike that of an ostrich plume. Other of these trees exhibit the same disregard of shape, though all alike possess large leaf areas.

The foliage of No. 2 extends to a distance of 55 feet laterally from the base of the trunk.

No. 439, the second heavist yielder, is isolated. The foliage of 401 extends outwards about 40 feet; there is a nutmeg within 8 feet of it. No. 445 has a very fine crown overtopping small clove trees in the vicinity. The foliage of No. 1 extends to 44 feet. No. 7 to 31 feet.

No definite conclusion can be drawn as to the effect of early branching. The two heaviest yielders branch early; No. 2 at 12 feet, and No. 439 at 15 feet; No. 438 also at 15 feet. No. 1 at 5 feet, No. 3 at 7 feet, No. 390 at 12 feet, No. 291 at 15 feet. On the other hand, 401, 85, 90, 221, 23, 36, 40, run up to from 20 to 40 feet before branching.

No. 439, the best yielder after No. 2, is one of the smallest trees under trial. The trees of the Riverside plantation, which gave the highest average

yield of dry rubber, have a mean girth of 71 inches, against an average of 89 inches in the 37-year-old trees. All are large trees, but as far as they go these trials seem to show that after a certain size has been reached, increased girth measurement does not necessarily mean increased yield.

Root Extension.

Given room the trees have extended their roots to a greater distance than their branches. At 55 feet the roots of No. 2 were of the size of a lead pencil and still extending, but they were not visible at the surface. A root No. I, 1¼ inch in thickness, was observed at the surface 60 feet from the base of the trunk. It then descended into the ground. A root of No. 40 outcrops at 80 feet from the trunk. This tree gave 17 lbs. 5¼ oz. of dry rubber in the 3½ months.

The Importance of Room.

These trials seem to bring out very strongly the importance of giving Hevea room to extend in one direction. It is perhaps reasonable to suppose that had these trees room in every direction even better results would have been obtained; but it is not the object of this paper to attempt to evolve the ideal plantation, but to record facts and to offer suggestions based on those facts. The Henaratgoda trees are particularly happy in not having the issue complicated by subsidiary influences. The soil is pure, the trees have never been manured; the ground is not forked or weeded or grazed. Twice a year the bents are cut with a sickle, and periodically the leaves are swept up and taken away, Henaratgoda being a botanic garden to be kept tidy. This is the treatment these trees have been subjected to. There is a river close by, but this does not enable the inside congested trees to give more than 1·4 lbs. per annum. We are driven to the conclusion that the controlling factors have been air, light and root room, these trees having had room at least on one side to extend.

Application of these Results to the Question of Spacing.

It has not escaped some observers that Hevea trees growing in pairs do not seem to suffer from the fact, and at the meeting of the Committee of Agricultural Experiments held at Peradeniya on March 16th, it was decided to lay out a plantation to test this principle. Fig I is a plan of a plantation based on this principle, but carried one step further, four trees being planted closely together (10 feet by 19 feet) instead of two. Two would perhaps be better than four and one than two, but, the Henaratgoda trials afford good grounds for expecting a plantation, E laid out on the four-square plan illustrated in fig. I would be in time returning heavy yields as compared with present standards. It gives every tree room to extend freely on two sides.

Proportion of Latex to Dry Rubber.

Tables V., VI., and VII. give interesting comparisons of the proportion of latex to dry rubber in the various trees. In the great No. 2 tree the latex is rich, though one or two trees showed a slightly higher proportion of rubber. With the old original trees a mean of 1,270·49 cc. of latex produced 1 lb. of dry rubber, with those of the second plantation 1,311·55, the Riverside 1,454·00. Taking the figures of the old trees as unity, the proportions may be represented as 1, 1·032, 1·160, *i. e.*, 1·042 times as much latex was required from the trees of the second plantation as from those of the first to make one pound of dry rubber.—R. N. Lyne, Director of Agriculture Peradeniya, March 29, 1912.—*Bulletin of the Department of Agriculture, Ceylon*, for May, 1913.—*The Ceylon Observer*.